

ABSTRACT

Improvements in preventing heat- and moisture-shrink problems in specific polypropylene tape fibers are provided. Such tape fibers are basically manufactured through the initial production of polypropylene films or tubes which are then slit into very thin, though flat (and having very high cross sectional aspect ratios) tape fibers thereafter. These inventive tape fibers (and thus the initial films and/or tubes) require the presence of relatively high amounts of certain compounds that quickly and effectively provide rigidity to the target polypropylene tape fiber. Generally, these compounds include any structure that nucleates polymer crystals within the target polypropylene after exposure to sufficient heat to melt the initial pelletized polymer and allowing such an oriented polymer to cool. The compounds must nucleate polymer crystals at a higher temperature than the target polypropylene without the nucleating agent during cooling. In such a manner, the “rigidifying” nucleator compounds provide nucleation sites for polypropylene crystal growth. Subsequent to slitting the initial film and/or tube, the fiber is then exposed to sufficient heat to grow the crystalline network, thus holding the fiber in a desired position. The preferred “rigidifying” compounds include dibenzylidene sorbitol based compounds, as well as less preferred compounds, such as [2.2.1]heptane-bicyclodicarboxylic acid, otherwise known as HPN-68, sodium benzoate, certain sodium and lithium phosphate salts [such as sodium 2,2'-methylene-bis-(4,6-di-tert-butylphenyl)phosphate, otherwise known as NA-11]. Specific methods of manufacture of such inventive tape fibers, as well as fabric articles made therefrom, are also encompassed within this invention.